

An Infrared Fiber-Optic Raman Sensor for Field Detecting of Organic Biomarkers, Phase II

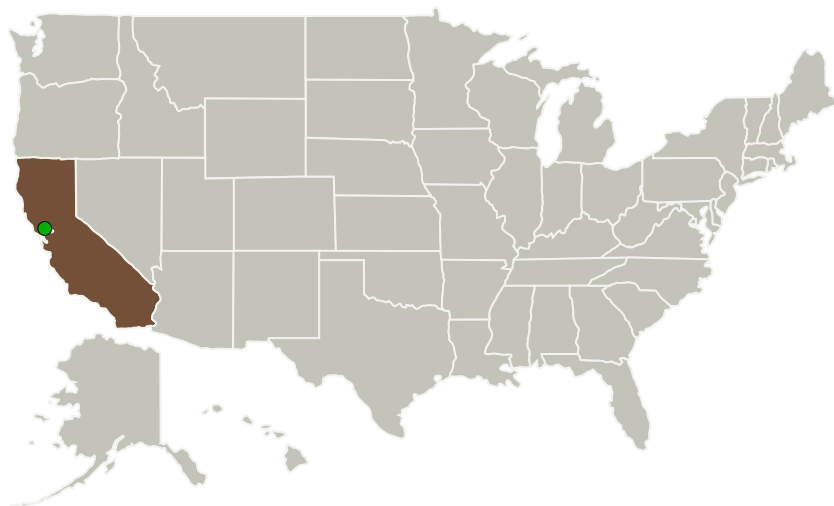
Completed Technology Project (2011 - 2013)



Project Introduction

The search for organics on Mars remains a key objective for future missions. However current instruments for detailed organic analysis require complex sample handling and can process only a limited number of samples. To allow for rapid sample characterization, the in situ non-destructive Raman detection technique is a highly desirable sensing tool for both qualitative and quantitative analysis. However, current Raman systems deployed in the field are inadequate due to deleterious fluorescence interference. Fluorescence is often several orders of magnitude more intense than Raman scattering signals and its broad structures spectrum could be difficult to remove from Raman spectra. We propose to develop a rover-mounted infrared fiber-optic Raman sensor that can eliminate fluorescence with significantly improved Raman sensitivity for fast field detections. The infrared fiber-optic Raman sensor is based on recent technology advances in fiber lasers, fiber optic Raman probes and infrared detector arrays. Innovative infrared fiber-optic Raman sensor enables highly sensitive fluorescence-free Raman analysis and offers flexible remote detection, so that the field spectral sensor's overall performance would be intact and extremely flexible for planetary missions. We will deliver a rover-mounted infrared fiber-optic Raman sensor to NASA at the end of Phase II program.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Crystal Research, Inc.	Lead Organization	Industry	Fremont, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California

Project Transitions

**June 2011:** Project Start**May 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140351>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Crystal Research, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Suning Tang

Co-Investigator:

Suning Tang

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Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.2 Atomic and Molecular Species Assessment

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System